

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>2414-101</b>	<b>FOR FURTHER ACTION</b> <div style="text-align: right;">See Form PCT/IPEA/416</div>	
International application No <b>PCT/CA2005/000534</b>	International filing date ( <i>day/month/year</i> ) 07 April 2005 (07-04-2005)	Priority date ( <i>day/month/year</i> ) 12 April 2004 (12-04-2004)
International Patent Classification (IPC) or national classification and IPC IPC: <b>B21D 51/18</b> (2006.01), <b>B23K 11/04</b> (2006.01), <b>B23K 37/04</b> (2006.01)		
Applicant <b>VANDERBEKEN, MARK</b>		
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.  2. This REPORT consists of a total of <u>6</u> sheets, including this cover sheet  3. This report is also accompanied by ANNEXES, comprising: a. <input checked="" type="checkbox"/> ( <i>sent to the applicant and to the International Bureau</i> ) a total of <u>4</u> sheets, as follows: <input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70 16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. 1 and the Supplemental Box. b. <input type="checkbox"/> ( <i>sent to the International Bureau only</i> ) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).		
4. This report contains indications relating to the following items: <input checked="" type="checkbox"/> Box No. I      Basis of the report <input type="checkbox"/> Box No. II     Priority <input type="checkbox"/> Box No. III    Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV    Lack of unity of invention <input checked="" type="checkbox"/> Box No. V     Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI    Certain documents cited <input checked="" type="checkbox"/> Box No. VII    Certain defects in the international application <input checked="" type="checkbox"/> Box No. VIII   Certain observations on the international application		
Date of submission of the demand 10 February 2006 (10-02-2006)	Date of completion of this report 17 August 2006 (17-08-2006)	
Name and mailing address of the IPEA/CA Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001(819)953-2476	Authorized officer  <div style="text-align: right;">Craig MacMillan (819) 934-3422</div>	

**Box No. I Basis of the report**

1. With regard to the **language**, this report is based on:
- ☒ the international application in the language in which it was filed
  - ☐ a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of:
    - ☐ international search (Rules 12.3(a) and 23.1(b))
    - ☐ publication of the international application (Rule 12.4(a))
    - ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))
2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
  - ☒ the description:
    - ☒ pages 1-11 as originally filed/furnished
    - ☐ pages\* received by this Authority on \_\_\_\_\_
    - ☐ pages\* received by this Authority on \_\_\_\_\_
  - ☒ the claims:
    - ☐ pages as originally filed/furnished
    - ☐ pages\* as amended (together with any statement) under Article 19
    - ☒ pages\* 12-15 received by this Authority on Feb. 10, 2006 (2006/02/10)
    - ☐ pages\* received by this Authority on \_\_\_\_\_
  - ☒ the drawings:
    - ☒ pages 1/26-26/26 as originally filed/furnished
    - ☐ pages\* received by this Authority on \_\_\_\_\_
    - ☐ pages\* received by this Authority on \_\_\_\_\_
  - ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages \_\_\_\_\_
  - ☐ the claims, Nos. \_\_\_\_\_
  - ☐ the drawings, sheets/figs \_\_\_\_\_
  - ☐ the sequence listing (*specify*): \_\_\_\_\_
  - ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c))
- ☐ the description, pages \_\_\_\_\_
  - ☐ the claims, Nos. \_\_\_\_\_
  - ☐ the drawings, sheets/figs \_\_\_\_\_
  - ☐ the sequence listing (*specify*): \_\_\_\_\_
  - ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims	<u>1-34</u>	YES
	Claims	<u>NONE</u>	NO
Inventive step (IS)	Claims	<u>1-34</u>	YES
	Claims	<u>NONE</u>	NO
Industrial applicability (IA)	Claims	<u>1-34</u>	YES
	Claims	<u>NONE</u>	NO

**2. Citations and explanations (Rule 70 7)**

Reference is made to the following documents:

D1: US 3,863,479 A (X.LIPP) - 04 FEBRUARY 1975 (1975-02-04)

D2: US 2,986,193 A (P.HOWELL) - 30 MAY 1961 (1961-05-30)

D3: US 4,074,847 A (M.MCFATTER) - 21 FEBRUARY 1978 (1978-02-21)

**Novelty (N):**

Claims 1-34 are novel and do comply with Article 33(2) of the PCT. The prior art, exemplified by D1, D2 and D3, does not explicitly teach the method or apparatus for manufacturing a circular tank or the product therefrom. The subject matter of the claims differs from the prior art by specifically reciting chair and "L" bends on the lower and upper edges of an elongated metal sheet, respectfully, where these bends cooperate to form a helical seam of a circular metal tank.

**Inventive Step (IS):**

Claims 1-34 do comply with Article 33(3) of the PCT. The subject matter of claims 1-34 is considered to involve an inventive step since the prior art does not fairly suggest to employ chair and "L" bends on the lower and upper edges of an elongated metal sheet, respectfully, where these bends cooperate to form a helical seam of a circular metal tank. The bends cooperate with each other and provide many specific advantages over the prior art including structural rigidity, improved weldability and increased tank size without the use of internal vertical stiffening.

**Industrial Applicability (IA):**

The subject matter of claims 1-34 is considered to be industrially applicable and thus complies with the requirements Article 33(4) of the PCT.

**Box No. VII**      **Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

1. Drawing pages containing figures 1a through 14b do not comply with PCT Rules 11.2(a) and 11.13(a). The drawings are unsuitable for reproduction due to the use of unnecessarily light lines.
2. The drawings do not comply with PCT Rule 11.7(a). The pages containing the drawings shall be numbered.

**Box No. VIII** Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

1. The description does not comply with PCT Article 5. A statement in an application, such as found on page 1, which includes a reference to any provisional application, should be removed. The PCT does not provide for any Reference to provisional applications.
2. The description does not comply with PCT Article 6. A statement in an application, such as found on page 11, which implies that the extent of protection may be expanded in some vague and not precisely defined way, is not permitted.

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

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## I claim:

1. A method for manufacturing a circular metal tank, comprising:
  - a) providing an elongated sheet of metal;
  - 5 b) bending said sheet of metal along an upper longitudinal edge thereof to produce a first bend;
  - c) bending said sheet of metal along a lower longitudinal edge thereof to produce a second bend;
  - d) moving said sheet of metal in a helical trajectory such that said second bend comes into proximity above said first bend;
  - 10 e) welding said second bend to said first bend to form a wall of said tank, said wall having a continuous helical weld;wherein said first bend is an "L" bend; and  
wherein said second bend is a chair bend.
- 15 2. The method of claim 1, wherein said elongated sheet of metal is a coiled sheet of metal which is decoiled prior to said bending steps.
3. The method of claim 1, wherein said first and second bends cooperate to form a helical roller track on an outside of said tank, wherein said tank is supported on a plurality of rollers that engage said roller track, and wherein said tank is rotated  
20 about its longitudinal axis on said rollers such that said tank moves upwards as said sheet of metal is welded to a bottom thereof.
4. The method of claim 1, wherein said metal sheet is corrugated before said welding step.
- 25 5. The method of claim 1, wherein prior to said welding step adjacent portions of said first and second bends are gross positioned and then fine positioned.
6. The method of claim 3, wherein at least one of said rollers is motorized and said tank and said metal sheet are moved by means of said motorized roller.
7. The method of claim 1, wherein said metal sheet is made of one of aluminum,  
30 galvanized steel, stainless steel, carbon steel.

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8. The method of claim 1, wherein said first bend forms an angle of between 45 and 135 degrees with a body of said metal sheet.
9. The method of claim 1, wherein said first bend has a width of 5 mm to 100 mm.
10. The method of claim 1, wherein a width of a horizontal portion of said second bend is between 5mm to 100 mm.
11. The method of claim 1, wherein a width of a vertical portion of said second bend is between 5mm to 150 mm.
12. The method of claim 1, wherein a top of said tank is cut so as to create an upper circumferential edge which is parallel to the ground.
13. The method of claim 1, wherein a bottom of the tank is cut to create a lower circumferential edge which is parallel to the ground.
14. A system for manufacturing a circular metal tank, comprising:
- (a) a decoiler for decoiling a coiled sheet of metal;
  - (b) a bender/corrugator for introducing a first bend along an upper longitudinal edge of said metal sheet and a second bend along a second longitudinal edge of said metal sheet;
  - (c) a support system having rollers, for moving said metal sheet along a helical trajectory, supporting said tank and for rotating said tank about its longitudinal axis as said metal sheet is added to a bottom edge of said tank;
  - (d) a welding positioner for positioning said second bend proximate and above said first bend;
  - (e) a welder for welding said first and second bends together to form a circular wall of said tank;
- wherein said first bend is an "L" bend and said second bend is a chair bend.
15. The system according to claim 14, further comprising a vertical coil seam welder for butt-welding an end of a first coiled metal sheet to an end of a second coiled metal sheet before said metal sheet pass through said bender/corrugator.
16. A system according to claim 14, further comprising a welding pre-aligner for gross positioning said first and second bends before said first and second bends are positioned by said welding positioner.



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17. A system according to claim 14, wherein said first and second bends cooperate to form a helical roller track on an outside of said tank, and wherein said tank is supported on said rollers that engage said roller track.
18. A system according to claim 14, wherein said bender/corrugator additionally corrugates said metal sheet.
19. A system according to claim 17, wherein at least one of said rollers is motorized and said tank and said metal sheet are moved by means of said motorized roller.
20. A system according to claim 14, wherein said metal sheet is made of one of aluminum, galvanized steel, stainless steel, carbon steel.
21. A system according to claim 14, wherein said first bend forms an angle of between 45 and 135 degrees with a body of said metal sheet.
22. A system according to claim 14, wherein said first bend has a width of 5 mm to 100 mm.
23. A system according to claim 14, wherein a width of a horizontal portion of said second bend is between 5mm to 100 mm.
24. A system according to claim 14, wherein a width of a vertical portion of said second bend is between 5mm to 150 mm.
25. A system according to claim 14, further comprising means for cutting a top of said tank so as to create an upper circumferential edge which is parallel to the ground.
26. A system according to claim 14, further comprising means for cutting a bottom of the tank to create a lower circumferential edge which is parallel to the ground.
27. A circular metal tank, comprising a tank wall, said tank wall comprising an elongated sheet of metal, said elongated sheet of metal having a first bend along an upper longitudinal edge thereof and a second bend along a lower longitudinal edge thereof, wherein said sheet of metal follows a helical trajectory such that said second bend comes into proximity above said first bend and is welded thereto such that said tank wall has a continuous helical weld, wherein said first bend is an "L" bend and said second bend is a chair bend.
28. A tank according to claim 27, wherein said weld is a fillet weld on an inside of said wall.

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29. A tank according to claim 27, wherein said first and second bends cooperate to form a helical roller track on an outside of said tank
30. A tank according to claim 27, wherein said sheet of metal is made of one of aluminum, galvanized steel, stainless steel, carbon steel.
- 5 31. A tank according to claim 27, wherein said first bend forms an angle of between 45 and 135 degrees with a body of said metal sheet.
32. A tank according to claim 27, wherein said first bend has a width of 5 mm to 100 mm.
- 10 33. A tank according to claim 27, wherein a width of a horizontal portion of said second bend is between 5mm to 100 mm.
34. A tank according to claim 27, wherein a width of a vertical portion of said second bend is between 5mm to 150 mm.